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Employment Uncertainty and Fertility: A Network Meta-Analysis of European Research Findings

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Abstract

The relationship between employment uncertainty and fertility is a major topic in demographic research. Since, particularly, the *Great Recession*, increasing numbers of papers on this matter have been published. Uncertainty is usually deemed to have a negative effect on fertility, but different fertility reactions are hypothesized by sociological theories, and micro-level evidence is fragmentary and contradictory. In this article, we use network meta-analysis to synthesize European research findings and to offer general conclusions about the effects of employment uncertainty on fertility (in terms of direction and size) and to rank different sources of uncertainty. Our results suggest that employment uncertainty is detrimental for fertility. For men, being unemployed is more detrimental for fertility than having time-limited employment; for women, time-limited employment is the worst condition for fertility, while unemployment is often used as an opportunity window for having children. Next, the negative effect of time-limited employment on fertility has become stronger over time, and is more severe in Southern European countries, where social protection for families and the unemployed is least generous. Finally, we demonstrate that failing to account for income and partner's characteristics leads to an overestimation of the negative effect of employment uncertainty on fertility. We advance the role of these two factors as potential mechanisms by which employment uncertainty affects fertility.

Keywords: employment uncertainty; fertility; meta-analysis; Europe

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1. Introduction

The role of employment uncertainty as a key driver in fertility decision-making has long been on demographers and sociologists' research agenda. Generally speaking, the notion of employment uncertainty refers to clarity, or the lack thereof, about what will happen in the labor market and the likely availability of a stable job or, indeed, any job to cover household expenses (Scherer 2009; see also Bloom 2014; Moore 2016). Individuals who are uncertain about their future income and earning opportunities may shy away from long-term commitments and, thus, postpone leaving the parental home, setting up their own household and having children (Billari 2005). A persistent experience of uncertainty may even lead to the perpetual postponement of family formation and, as a result, to a smaller family size or even to no family at all (Busetta et al. 2019). On the other hand, individuals may use periods of employment uncertainty to have children, in particular if they have other income sources (Mills and Blossfeld 2005; Vignoli et al. 2012) or if they have little to lose in terms of future employment prospects (Friedman et al. 1994).

Empirical studies, likewise, provide no clear predictions about the relationship between employment uncertainty and fertility. Although much research has been published on the relationship between employment uncertainty and fertility, the results are heterogeneous and contradictory. What is more, micro-level studies are context-dependent, elucidating only one part of the nexus between employment uncertainty and fertility. For instance, different indicators were used to assess the effect of employment uncertainty on fertility; primarily unemployment and time-limited contracts. At the same time, researchers often focused on parity-specific transitions, on a particular time period or on specific cohorts; they also included different control variables in their model equations. All this has made for a crowded, but fragmented state-of-the-art about this topic.

This article aims to draw general conclusions from existing micro-level results about the size and the direction of the impact of employment uncertainty on fertility in Europe. We confine our analysis to European countries because they display an interesting variation in fertility and labor market patterns, while also sharing certain economic, social, and cultural similarities. By using meta-analysis techniques, we synthesized, compared and combined the empirical evidence available in the literature, taking advantage of the abundance of independent studies on this topic conducted on different data sets. Additionally, we inspected how the association between economic uncertainty and fertility changes across time and space (i.e. between different family and labor market regimes).

Meta-analysis has been successfully employed in family demography research (Matysiak and Vignoli 2008; Matysiak et al. 2014), but with this paper we offer a step forward. In fact, we performed not only classic pairwise meta-analyses, separately comparing the effects on fertility of the two conditions of employment uncertainty – i.e., unemployment/time-limited employment vs.

employment/unlimited-time employment, but also a Network Meta-analysis (hereafter NMA), which included unemployment, limited-time employment and unlimited time employment in a common network of evidence. This approach enabled us to offer general conclusions about the relative ranking of these three conditions on fertility. The NMA is widely used in medicine as a tool to combine information from clinical trials, in the presence of multiple competing treatments. Compared with pairwise meta-analyses, network meta-analysis allows for the combination of direct (informed by data) and indirect (indirectly derived from the observed) evidence. It also estimates the relative effectiveness of each treatment in respect to each other and ranks them according to their efficacy (Tonin et al. 2017). This is the first implementation of a network meta-analysis in population research.

2. Background

2.1 The puzzle to solve

Employment uncertainty has become an inherent part of adults' life-courses in Europe. Already in the 1980s, the crisis of the Fordist model had led to a lack of job creation and a dramatic increase in unemployment rates in the West of Europe, particularly among the young. Persistently high youth unemployment was often attributed to the rigidity of European labor markets, i.e. excessive protection for permanent jobs (Cutuli and Guetto 2013). Consequently, in the last two decades of the twentieth century, Western European labor markets experienced strong deregulation, which, however, further increased employment uncertainty, again in particular among the young (Bentolila et al. 2012; Rubery and Piasna 2016). At the same time, the collapse of communism in Eastern Europe and economic restructuring led to a massive increase in unemployment in the region and to an increase in the instability of work contracts (Lehmann and Muravyev 2011). The ongoing integration of the global economy and progressive privatization and liberalization have further intensified labor market volatility and have led to an unprecedented level of structural uncertainty in Europe (Mills et al. 2005; Standing 2014). This condition has affected many workers and has been shown to have an impact on family life as well (Blossfeld et al. 2005; Blossfeld et al. 2006; Esping-Andersen 1999; Kreyenfeld et al. 2012; Mills and Blossfeld 2013). Since the Great Recession, papers addressing the effects of economic uncertainty on fertility intentions and behavior have increased drastically. Nevertheless, the economic uncertainty/fertility nexus is far from being clearly understood: theoretical premises are weak and empirical findings offer conflicting messages.

In 1999, Priya Ranjan developed a theoretical model, following Dixit and Pindyck (1994) and the financial option literature, in which uncertainty about future income leads people to postpone

childbearing to less uncertain times. Given the irreversible nature of the childbearing decision itself, individuals with an income under a certain threshold will wait to have a child until they can be more certain about income levels. On the other hand, the work by Debra Friedman and colleagues (1994) suggested that uncertainty may have a positive effect on fertility: when a woman has limited possibilities in the labor market, she might choose the "alternative career" of becoming a mother. This is even more likely if a mother has an alternative income source, for instance if her partner is established in the labor market (Vignoli et al. 2012) or if she receives reasonable support from the welfare state (Blossfeld and Mills 2005). However, this kind of behavior is less typical of men, in particular in countries with a traditional division of household labor (Schmitt 2008).

The effects of economic uncertainty on fertility may also depend on age, education, and the number of children the couple already has. Younger women, experiencing uncertainty, may be more likely to postpone childbearing than women who are reaching the end of their reproductive life (Kreyenfeld and Andersson 2014; Currie and Schwandt 2014). Studies suggest that highly-educated women are more prone to delay parenthood, as they usually have better chances, given time, for getting established in the labor market than low-educated women (Kreyenfeld 2009; Pailhé and Solaz 2012). They may also value a professional career more strongly and thus be more eager to search for a stable job rather than using a period of uncertainty to have a child. Finally, the relationship between employment uncertainty and fertility may also depend on parity. Individuals who are uncertain about their economic prospects are usually likely to postpone family formation until when they can accumulate resources and until at least one of the partners is established in the labor market. After entering parenthood, they may, however, decide to proceed with their childbearing plans, no matter the employment circumstances. This might be because they have little time to postpone higher order births or it might be because they want to provide a companion for their first child (Kreyenfeld and Andersson 2014; Wood and Neels 2017). On the other hand, however, they may postpone or even give up the decision to enlarge the family if they (continue to) experience uncertainty after becoming parents. The negative effect of economic uncertainty on subsequent birth transitions can be even stronger than the effect on the first birth. Here emotional reasons (the need for love) usually play a higher role in the decision to have the first child than they do with higher order children. Financial factors, meanwhile, typically weigh more on decisions about higher order parities (Bulatao 1981). At the same time, family enlargement may require substantial additional expenses, such as a car or a larger flat.

In this paper, we focused on two of the main markers of employment uncertainty, time-limited employment and unemployment, as compared to, respectively, unlimited-time employment and employment. These two indicators have been most often used in the literature to operationalize

employment uncertainty and have been found to generate uncertainties that have an impact on family formation in contemporary Europe (Blossfeld et al. 2005; Kohler and Kohler 2012; Vignoli et al. 2012).

2.2 Unemployment and fertility

Unemployment is a crucial indicator of employment uncertainty and it has often been used in demographic research (e.g., Özcan et al. 2010; Pailhé and Solaz 2012; Schmitt 2012b). Opposing theoretical effects of unemployment on fertility can be anticipated. On the one hand, unemployment erodes household financial resources by reducing a man or a woman's income, inhibiting – in turn – the demand for children (*income* effect). Being unemployed means uncertainties about the future, because potential parents do not know how long unemployment will last, total income loss, or the characteristics of a future job (Inanc 2015). On the other hand, unemployment might facilitate the decision to have a(nother) child by providing additional time for childbearing and childrearing (*substitution* effect). Given a continuing gendered household division of labor, this positive effect of unemployment on fertility is more likely to apply to women than to men. Indeed, male unemployment is more likely to signal a reduced breadwinner capability, favoring fertility postponement or even a reduction in family size (Schmitt 2008).

A substantial number of articles addressing the nexus between unemployment and fertility, have meant a substantial literature on the topic. Conclusions vary though. A positive relationship between unemployment and fertility was the most frequent result among women (e.g., Liefbroer and Corijn 1999 for the Netherlands and Flanders; Andersson 2000 for Sweden; Adsera 2011b for many European countries; Gonzalez and Jurado 2006 for Spain, Italy, Germany and France; Schmitt 2008 and 2012 for, respectively, Germany and the UK; Sinyavskaya and Billingsley 2015). However, some studies also yielded a not statistically significant (e.g., Gutiérrez-Domènech 2008; Özcan et al. 2010) or a negative result (e.g., Kravdal 2002). By contrast, male unemployment is usually related to lower birth risks (Neels et al. 2013; Pailhé and Solaz 2012; Kravdal 2002), but in some cases unemployment was found to be positive for men's fertility (e.g., Inanc 2015).

2.3 Time-limited employment and fertility

Traditionally, employment uncertainty was operationalized through unemployment, but more recently, studies have taken contract duration into account (e.g., Sutela 2012; Pailhé and Solaz 2012). The availability of temporary employment may increase employment chances for individuals that

would otherwise be cut out of the labor market (OECD 2002). In addition, some temporary jobs require lower engagement levels compared to unlimited-time employment, which, in association with reduced working hours, may facilitate work/family reconciliation among individuals who give priority to family life over career (Scherer 2009; Pirani and Salvini 2015). Some kinds of flexible contracts, even if unstable, can also increase job satisfaction, especially among highly-skilled workers (Guest et al. 2006), and entail higher wages (Kalleberg et al. 2000). Nevertheless, time-limited employment often reflects a low level of labor market integration and this is connected to low employment protection and to wage penalties (Schmitt, 2012b). In addition, individuals with time-limited employment tend to have physically stressful work, monotone and repetitive tasks, with little control over working hours. On average, they are less satisfied with their jobs and have worse physical and mental health (Benavides et al. 2000; Kalleberg 2009; Pirani 2017), with negative consequences for their private lives. Employment uncertainty generates fears and anxiety that might have negative consequences for individuals' quality of life and subjective well-being (D'Ambrosio 2012; Vignoli et al. 2018). Women are often overrepresented in fixed-term employment due, at least in part, to the greater family responsibilities they shoulder (Schmitt 2012b).

Because of the instability of temporary contracts and their low quality, one might expect that time-limited jobs would be detrimental for fertility, at least in the case of men. For women, the relationship may be more ambiguous for the same reasons that the relationship between unemployment and family formation is ambiguous. Empirical findings are, however, not always consistent with the expectations. For instance, analyzing the transition to parenthood of European graduates, Wolbers (2007) did not find any significant difference between individuals with unlimited-time and time-limited occupations in terms of the probability that they would have a first child. Similarly, de Lange and colleagues (2014) found that time-limited employment (as opposed to permanent employment) did not affect the timing of the first childbirth in the Netherlands. On the other hand, a large number of studies support the hypothesis of a negative relationship between time-limited employment and fertility for both men and women (e.g., Dupray and Pailhé 2018 for France; Lundstrom and Andersson 2012 for Sweden; Baizan 2005 for Denmark, Spain and UK; Blossfeld et al. 2006 for Germany). When gender-differences in the relationship between time-limited employment and fertility are detected, it usually happens that this kind of employment uncertainty is more detrimental for women than for men (e.g., Pailhé and Solaz 2012).

2.4 Differences by family and labor market regimes

Differences between micro-level findings are also likely to be driven by the social context of a given country. Theoretically, public policies play an important role in altering the effects of economic uncertainty on families (Blossfeld and Mills 2005). Welfare policies offer people some financial security and thus support them in realizing their fertility desires even in adverse economic conditions. Consequently, individuals living in countries with generous welfare support would be more likely to have a child despite a precarious labor market. Besides family policies, labor market policies (such as unemployment benefits, assistance in job searches or the level of employment protection) may also influence the relationship between economic uncertainty and fertility, by affecting unemployment duration, opportunities for entering employment and by providing financial support in the case of unemployment (Adserà 2004, 2005; OECD 2006; Caroleo and Pastore 2007). Finally, the incidence of women's labor force participation and the gender division of labor may also affect the magnitude of the relationship being studied, and in particular gender differences in that relationship. In countries where women are less present in the labor market and where the division of labor is more traditional, women may be more likely to use unemployment or temporary employment to have children. After all, it might be reasoned, by the family, that women's economic careers are less important than their male partners (Schmitt 2012b). At the same time, unemployed men and men in fixed-term contracts may be more likely to postpone childbearing in these countries.

Among European countries, Nordic countries are known for providing strong welfare support, and for implementing active labor market policies that facilitate entry into employment (Esping-Andersen 1999; Thévenon 2011). These countries are also characterized by high labor force participation among women and a more egalitarian division of household labor (Kan et al. 2011, Altintas and Sullivan 2016). Western Europe (Austria, Belgium, France, Germany, Luxembourg and the Netherlands) also provides strong financial support for the unemployed and has generous family policies (Gauthier 2002; Misra et al. 2007; Thévenon 2011), but this region (in particular Austria and Germany) still lags behind the Nordic countries when it comes to women's labor force participation and gender equality in the household (Steiber et al. 2016). The support for families in the United Kingdom and Ireland is weaker and is only directed towards those that have the greatest need (Barbieri and Bozzon 2016). At the same time, these two countries are characterized by highly flexible labor markets with relatively short unemployment spells and low temporary employment (Adsera 2004; Caroleo and Pastore 2007). Women's participation in the labor force is moderate, and usually takes the form of part-time employment (Connolly et al. 2016) while men tend to work long hours and have limited time for their families (Adler and Lenz 2015). Finally, social assistance for families and the unemployed is least generous in Southern Europe and in the post-socialist countries

of Central and Eastern Europe (CEE) (Esping-Andersen 1999; Caroleo and Pastore 2007; Javornik 2014). In addition, Southern Europe is known for high employment protection (particularly among more senior workers) and, as a result, high youth unemployment, high temporary employment and high involuntary self-employment (Barbieri and Scherer 2009; Venn 2009; Adserà 2011). The gender division of labor is heavily asymmetric, both in the east and the south, but women's employment plays a substantially greater role in the former countries, as it constitutes an important income source for families (Matysiak 2011).

3. Data and methods

3.1 Meta-sample

The premise of a meta-analysis is to cover all the articles ever published on the topic of interest. In order to accomplish this goal, a systematic procedure has been followed to retrieve articles and select them through the application of some inclusion/exclusion criteria.

We collected articles using the electronic database Scopus (www.scopus.com), the largest abstract and citation database of peer-reviewed literature with more than 60 million records. Scopus covers articles, articles-in-press, books, book chapters, and reviewed conference papers dating back to 1970. Book reviews and conference abstracts are not included. After a thorough Scopus search, we checked references within retrieved articles to find articles that had been missed or that were published too early to be included in the database. Finally, we sent our article list to eleven experts on the topic, asking them to check whether any important contribution was missing.

The selection of the results to be included in the meta-analysis was done on the basis of several inclusion/exclusion criteria: (i) we restricted the search to studies conducted in European countries; (ii) we included only articles and book chapters, excluding conference and working papers; (iii) we excluded qualitative works that did not provide a quantitative measure of the effect of interest; (iv) we disregarded macro-level studies about employment uncertainty and fertility, as we are interested in the micro-level.

We only considered articles in English. From a very large initial number of articles retrieved in the literature, 52 papers were selected with our criteria for the meta-analysis. Out of these 52 articles, 23 deal with a comparison between time-limited employment and unlimited-time employment, and 44 with the comparison between unemployment and employment (some of them deal with both). Due to the fact that some articles reported specific analyses for subgroups (e.g., men and women, childless individuals and parents, different countries), each article might include more

than one effect estimate. In fact, we obtained a final sample of 46 effect estimates regarding time-limited employment *versus* unlimited-time employment and 110 effect estimates about unemployment *versus* employment. Though, as noted in the previous section, the effects of economic uncertainty on birth risks may vary by education and by woman's age only a few studies investigated this relationship in any kind of detail. We were, thus, obliged to abstain from collecting effect sizes by woman's age and education, though this information would have been theoretically relevant.

The presence of publication bias was investigated by funnel plots, where the effect sizes from the studies in the meta-sample expressed as log odds ratios (X axis) are reported against their standard errors in descending order (Y axis) (see Figures 2, 4, 6, 8 in the Appendix). The symmetry of the funnel plot in respect to the vertical line corresponding to the meta-analytic overall effect is indicative of no relevant publication bias. We tested for funnel plots asymmetry using the Egger's test (Egger et al. 1997) (see Table 10 in the Appendix).

3.2 Random effect meta-analysis with a Bayesian approach

From each article, we extracted one or more effect estimates (depending on whether more than two employment conditions were investigated), with the associated standard errors. The effect estimates consisted of relative risks (RR) or odds ratios (OR) of childbearing for individuals with a limited- versus unlimited time contract (LT/UT) and for unemployed individuals compared to the employed (UN/EM). First, for each pairwise comparison of interest, we specified random-effects meta-analysis models, which accounted not only for within-study sampling errors (measured by the estimated standard errors reported in the papers), but also for the heterogeneity of the effect size among studies. In this way, we relaxed the assumption that each estimate represented a measure of the same "true effect", allowing for the fact that the effect size could vary according to study characteristics (Borenstein et al. 2010). When a study includes more than one effect-estimate (e.g., country-specific, gender-specific), we assume, for the sake of simplicity, independence between estimates. We performed all the meta-analyses within a Bayesian framework, which, with respect to the frequentist approach, provides a more appropriate quantification of between study heterogeneity (Sutton and Abrams 2001).

Let $(b_1, s_1), (b_2, s_2), \dots, (b_n, s_n)$ be the set of *n* point estimates of log RR or log OR with their estimated standard errors, the random effects meta-analysis models assume:

$$b_i|\beta_i, s_i^2 \sim N(\beta_i, s_i^2) \qquad \beta_i|\beta, \tau^2 \sim N(\beta, \tau^2)$$

where β_i are study-specific effect estimates, β is the overall effect, expressing the average effect over the studies, and τ^2 is a term of variance expressing heterogeneity among studies.

Within the Bayesian framework, prior distributions on the model hyper-parameters must be specified, which are then combined with the likelihood of the observed data to obtain a joint posterior distribution. We specified non-informative priors on β and τ^2 (a Normal distribution with mean equal to 0 and variance equal to 10^6 for β; an Inverse-Gamma distribution with both parameters equal to 10^{-4} for τ^2), in order to reflect our *a priori* ignorance about the value of the hyper-parameters. Then, a sample from the joint posterior distribution of the model parameters was obtained using the Gibbs sampling algorithm implemented in the WinBUGS software (Lunn et al. 2012). Three chains of 25,000 values were generated, and a 3000-run burn-in was applied. The marginal posterior distributions of the parameters of interest were obtained through the marginalization of the joint posterior distribution.

3.3 Uni-variate and multi-variate analyses

The impact of employment uncertainty on fertility has been shown to present different connotations between genders. In addition, it is a well-established fact that these relationships may be further modified by social context. We thus clustered the countries covered by the original studies into country groups and considered gender and country group as possible moderators of the relationship between employment uncertainty and fertility.

We next investigated: whether the effects of economic uncertainty on fertility obtained from more recent data are stronger than those based on older data; whether they differed between a transition to first or to second and higher order birth; and whether they depended on controls for income (any source of income, either individual or household) and partners' characteristics (educational attainment, labor market status, earnings). We performed this investigation within the meta-regression framework, controlling for gender and country group. The meta-regression model can be formalized as follow. Let $x_1, x_2, \dots, x_K$ be K covariates to be included in the meta-regression model and $\gamma_1, \gamma_2, \dots, \gamma_k$ the associated parameters, we assumed:

$$b_i|\beta_i, s_i^2 \sim N(\beta_i, s_i^2) \qquad \beta_i|\gamma_1, \dots, \gamma_K, \tau^2 \sim N\left(\sum_{k=1}^{K} \gamma_k x_{ki}, \tau^2\right)$$

As in the previous models, vague priors were specified for the hyper-parameters: $\gamma_k \sim N(0, 10^4)$; $\beta \sim N(0, 10^6)$; $\tau^2 \sim IG(0.001, 0.001)$. The meta-regression was estimated separately for the effect of unemployment *versus* employment and the effect of time-limited *versus* unlimited employment.

Controlling for gender and country group, we first added parity and period as explanatory variables. The variable "parity" was a dummy that was equal to 0 if the effect referred to the progression to first birth individuals and equal to 1 if the effect referred to the progression to second

and higher-order births. The variable "period" was computed as the median year of the study period. For example, if the original model included births which happened between 1990 and 2000 the period was set equal to 1995. Furthermore, we added the variable "income", which assumed the value 0 if the estimated effect was adjusted for individual or household income, and 1 otherwise; and the "couple", which was 0 if the study did not control for partner's characteristics and 1 otherwise. Considering the small sample size, we preferred to use two separate models to investigate the "couple effect" and the "income effect".

3.4 Network meta-analysis

The NMA allowed for a comparison between multiple conditions of employment uncertainty. We pooled together the collected evidence in a network of comparison between unlimited time employment, time-limited employment and unemployment. Figure 1 exemplifies the difference between a classical pairwise meta-analysis and a network meta-analysis. It should be noticed that the NMA did not include the effect estimates that compared unemployed and employed individuals when the latter category included both time-limited and unlimited-time workers. This was because of the need to focus on mutually exclusive employment conditions. Consequently, while the number of effect-estimates involving time-limited employment did not change, the number of effect-estimates involving unemployment falls to 24 (see Table 11 in the Appendix for a complete list of studies and their inclusion in the meta-analyses and in the network meta-analysis).

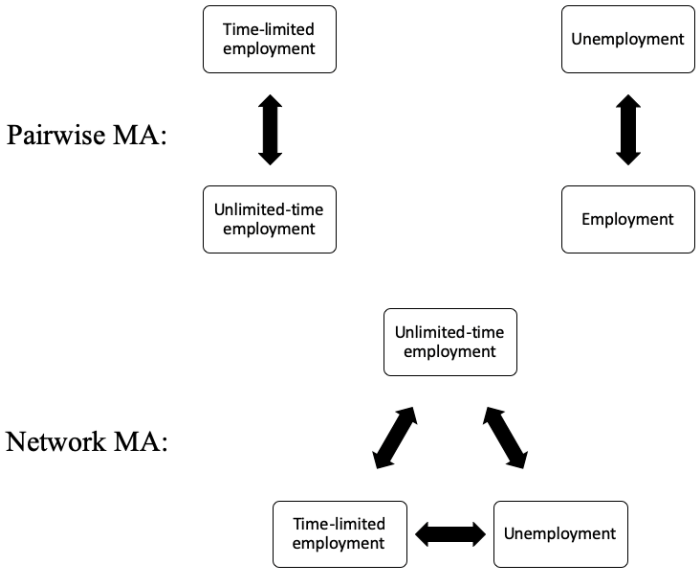
Along with the within-trial variability and between-trial heterogeneity, network meta-analysis exhibits an additional source of variability that is termed "inconsistency". Heterogeneity captures discrepancies between estimates of the same effect arising from studies with the same design (two study have same design when they compare exactly the same set of conditions). "Inconsistency" is a special kind of heterogeneity that captures divergences arising when the same effect is measured in studies with different designs (e.g., the effect of time-limited employment on childbearing may differ when it comes from studies that restrict comparisons of fertility behavior of time-limited vs. unlimited-time employed individuals, with respect to studies of the whole population, which also include unemployed and inactive individuals), or when direct and indirect evidences provide different results (e.g., the effect of time-limited employment as opposed to unemployment on fertility is either directly observed or derived from other effect-estimates). Following Higgins et al. (2012), we specified a model which accounted for inconsistency through the inclusion of random terms w on specific comparisons. The model can be formalized as follows:

$$Y_{ibk} \sim N\left(d_{bk} + u_{ibk} + w_{bk}^{D_i}, \sigma_{ibk}^2\right)$$

$$u_{ibk} \sim N(0, \tau_{bk}^2) \quad w_{bk}^{D_i} \sim N(0, \tau_w^2)$$

where i indicates the study; k, b are the "treatments" that we are comparing (here, two of the three employment conditions of interest); Y_{ibk} is the estimate of the effect of the *treatment* k when compared with b in the i-th study; σ_{ibk} is the estimate of the standard error of Y_{ibk}; d_{bk} is the average effect of the *treatment* k when compared with b; u_{ibk} is a random term from a Normal distribution with mean equal to 0 and variance τ_{bk}^2 ; τ_{bk}^2 expresses the heterogeneity among studies for the comparison *k* versus *b*; $w_{bk}^{D_i}$ is a random term from a Normal distribution with mean equal to 0 and variance τ_w^2 which expresses the inconsistency for the comparison *k* versus *b* in the design of the i-th study (D_i); τ_w^2 captures the network incoherence. Following Higgins et al. (2012), some of the $w_{bk}^{D_i}$ terms were set to zero, in order to avoid over parametrization of the NMA model. We assumed random terms in the model to be mutually independent. Non-informative priors were defined on all the hyper-parameters in the model: Normal distributions with large variance $N(0, 10^5)$ for the effect measures d_{bk}, and Inverse Gamma distributions $IG(10^{-3}, 10^{-3})$ for τ^2 and τ_w^2 (Lumley 2002; Lu and Ades 2006).

Figure 1 – Schemes of the classic pairwise meta-analyses and network meta-analysis implemented in this article.



4. Results

4.1 Search outcome

Table 1 shows, separately for the employment condition investigated, how many effect estimates were available for each subgroup defined, according to gender, parity and country group.

The original studies more often investigated the relationship between economic uncertainty and fertility among women than men and they more often looked at the transition to parenthood than to higher order births. In fact, only eight studies investigate transition to higher-order parities among individuals with time-limited employment. We would have liked to include Central and Eastern European countries in the analysis of time-limited employment, but we did not find enough articles compatible with our criteria.

Table 1 – Meta-samples for the two pairwise meta-analyses (time-limited employment vs. unlimited-time employment; unemployment vs. employment).

Meta-sample		No of estimates		No of estimates
Time-limited employment vs. Unlimited-time employment	Women	30	Nordic countries	5
	Men	12	Western countries	14
	Childless	37	Southern countries	17
	Parents	8	German-speaking countries	5
Unemployment vs. Employment	Women	82	Nordic countries	28
	Men	25	Western countries	27
	Childless	63	Southern countries	15
	Parents	43	German-speaking countries	26
			CEE countries	9

Note: Nordic countries (Denmark, Finland, Norway, Sweden), Western countries (Belgium, France, Ireland, Netherlands, the UK), Southern countries (Italy, Greece, Portugal, Spain), German-speaking countries (Austria, Germany, Switzerland) and Central and Eastern European – CCE – countries (Armenia, Bulgaria, Estonia, Georgia, Hungary, Latvia, Lithuania, Moldova, Slovenia, Slovakia, Poland, Russia, Romania, the Czech Republic).

Source: our elaboration on meta-sample

4.2 Unemployment and fertility

Pairwise meta-analyses

We performed meta-analyses on all the available effect estimates and, then, separately by gender and by gender and geographical area. For each meta-analysis, the following results are reported (Tables

2 and 3): posterior mean of the overall effect ($OR = \exp(\beta)$); probability p; posterior median of the I^2 index and number of effect estimates covered by the meta-analysis. We call p the posterior probability for the effect to be larger than one (when the posterior mean was larger than one) or smaller than one (when the posterior mean was lower than one). In other words, p shows how much of the posterior distribution of the overall effect lies above or below 1: a value of p close to 1 refers to a reliable estimate. The I^2 index represents the percentage of total variability explained by between-study heterogeneity (Higgins and Thompson 2002): the higher the level of I^2, the higher the heterogeneity among studies. The funnel plots are reported in Figures 2 and 4, and the posterior distributions of the effects are plotted in Figures 3 and 5 (see Appendix). The funnel plots, reported in Figures 2 and 4, are overall symmetric, except that one for the global meta-analysis on women. This is confirmed by the Egger's test for funnel plots' asymmetry (see Table 10 in the Appendix). As can be seen from the plot (Figure 2), there are fewer effect-estimates in the lower left-hand corner; this means that a lower number of studies reporting a negative and uncertain (i.e., with large standard errors) effect of unemployment on women's fertility were retrieved. However, no significant publication bias is detected once the sample is further divided by country groups.

Although the findings for men were based on a much smaller number of effect sizes, our results suggest a substantial difference in the relationship between unemployment and birth risks between men and women (Table 2): while unemployed men were less likely to have a child than their employed counterparts (-11%), women exhibited higher odds of childbearing if unemployed (+8%). We also investigated how these findings by gender vary by country group (Table 3). Overall, we observed that unemployed women were consistently more likely to have a child than the employed ones in all country groups save in the Southern European countries, and that unemployed men were less likely to have a child in all country groups apart from Western countries (though the findings for men in Western European countries were rather uncertain, $p = 0.57$). Finally, our findings show that results concerning women are in general more heterogeneous then those about men, suggesting a higher uncertainty around results about women. It should also be noted that for CEE countries we located only one study on men's unemployment and fertility and for Southern Europe only two studies. We thus decided to show no estimates for these groups.

Table 2 – Random-effects meta-analyses about unemployment versus employment, pooled dataset and gender-specific results. ORs are reported.

	Average effect	p	I^2	Number of effect-sizes
Women	1.08	0.99	31.7%	82
Men	0.89	0.98	12.4%	25

Note: "p" is the proportion of simulated OR that are smaller (or larger) than 1, if the average OR is smaller (or larger than 1).

Source: our elaboration on meta-sample

Table 3 – Random-effects meta-analyses about unemployment versus employment, results by welfare states. ORs are reported.

Country group	Gender	Average effect	p	I^2	Number of effect-sizes
Nordic	Women	1.02	0.83	7.69%	19
	Men	0.91	0.97	2.82%	9
Western	Women	1.27	0.98	76.81%	19
	Men	1.04	0.57	34.03%	6
Southern	Women	0.95	0.75	28.51%	13
	Men	-	-	-	2
German-speaking	Women	1.15	0.98	14.54%	19
	Men	0.83	0.85	51.30%	7
CEE	Women	1.26	0.95	5.63%	8
	Men	-	-	-	1

Note: "p" is the proportion of simulated OR that are smaller (or larger) than 1, if the average OR is smaller (or larger than 1).

Source: our elaboration on meta-sample

Meta-regression

As a second step, we studied the role of parity, period, and partner's characteristics for the relationship between economic uncertainty and fertility by gender by performing meta-regressions. We did not include the indicator about income from work, because the unemployed do not have an income from work, and too few studies controlled for household income. In Table 4 we reported the posterior means of the meta-regressions and the posterior probabilities *p*. In this case, p is the posterior probability that the meta-regression coefficient is either positive (if the posterior mean is positive) or negative (if the posterior mean is negative).

Parity did not appear to be a relevant moderator of the effect of unemployment on fertility (p=0.775 among women, p=0.474 among men). Conversely, there was a negative effect of the period: more recent articles found a more strongly negative relationship between unemployment and fertility among men. Finally, studies at the couple-level found, for men, a weaker negative effect of

unemployment on fertility than individual-level studies, suggesting that studies that fail to account for partners' characteristics overestimated the effect of male employment uncertainty on fertility.

Table 4 – Meta-regression (dependent variable: effect-estimates about unemployment vs. employment). The model controls for welfare state.

	Women (n=78)		Men (n=25)	
	Coefficient	***P***	**Coefficient**	***p***
Second or higher order birth *(ref. first birth)*	0.046	0.775	-0.007	0.474
Period	-0.008	0.957	-0.015	0.921
Couple level *(ref. individual level)*	-0.010	0.449	0.182	0.941

Note: results are controlled for gender and welfare state grouping; "p" is the proportion of simulated coefficients that are smaller (or larger) than 0, if the average coefficient is smaller (or larger than 1).

Source: our elaboration on meta-sample

4.3 Time-limited employment and fertility

Pairwise meta-analyses

Results about the relationship between time-limited contracts and fertility show that working with a time-limited contract has a significant negative effect on fertility, for both men and women. This effect is particularly strong for women, who have a 14% lower risk of having a child if they work on a fixed-term contract (in comparison to women on time-unlimited contracts, see Table 5). This estimate is very reliable because the *p* is 1 and heterogeneity is low. The effect for men is weaker and less precise.

We also investigated how these effects vary by country group (Table 6). We decided to present only the findings for women by country group. We did so as we have few estimates for men. We also show the results for women and men combined, as the effect of time-limited employment on fertility seems to be negative for both of them. The OR of having a child for time-limited female workers compared to unlimited-time female workers goes from 0.88 in Western European countries to 0.84 in Southern Europe, while it is not significant in Germany. The relationship between time-limited employment and fertility is strongest in the Scandinavian countries where the OR for women is 0.74 (and 0.81 for the whole sample), although based on a low number of original studies. In this analysis, the I^2 index (56.61%) is indicative of a moderate heterogeneity among Nordic studies.

The funnel plots (Figures 6 and 8) are substantially symmetric and the Egger's tests not significant, suggesting the absence of publication bias. The posterior distributions of the overall effects are shown in Figures 7 and 9 (see Appendix).

Table 5 – Random-effects meta-analyses about time-limited employment versus unlimited-time employment, pooled dataset and gender-specific results. ORs are reported.

	Average effect	**p**	I^2	**Number of effect-sizes**
Women	0.86	1.00	0.9%	30
Men	0.94	0.97	0.7%	12

Note: "p" is the proportion of simulated OR that are smaller (or larger) than 1, if the average OR is smaller (or larger than 1).

Source: our elaboration on meta-sample

Table 6 – Random-effects meta-analysis for time-limited employment *versus* unlimited-time employment, results by welfare states. ORs are reported.

Country group	**Gender**	**Average effect**	**p**	I^2	**Number of effect-sizes**
Nordic	Women	0.74	0.93	56.61%	3
	Total	0.81	0.98	32.9%	5
Western	Women	0.88	0.97	15.64%	9
	Total	0.89	0.99	4.30%	14
Southern	Women	0.84	0.99	0.52%	15
	Total	0.84	0.99	0.40%	17
German-speaking	Women	0.95	0.62	10.62%	3
	Total	0.99	0.54	4.91%	5
CEE	Women	-	-	-	-
	Total	-	-	-	-

Note: "p" is the proportion of simulated OR that are smaller (or larger) than 1, if the average OR is smaller (or larger than 1).

Source: our elaboration on meta-sample

Meta-regressions

Table 7 shows the result from meta-regression models in which we studied the role played by parity, period, partner's characteristics, and income. Due to the small size of the time-limited *vs.* unlimited time employment sample, it was impossible to run gender-specific meta-regressions. The results of these were too imprecise, yielding unreliable estimates. Accordingly, Table 7 reports average effects across genders. We consider this approach to be appropriate given that our descriptive findings

suggest no substantial differences between men and women in terms of the effects of time-limited employment on fertility.

Results show that time-limited employment is slightly more detrimental for parents' transition to higher-order parities than for the transition to parenthood. As regards the effects of the period of analysis, we detected a relatively small, but non-negligible negative effect: the effect of time-limited employment on fertility becomes stronger over time. The positive coefficient for the couple indicator indicates that studies that controlled for some of the partner's characteristics found, on average, a smaller effect of uncertainty on fertility. Finally, the income variable had a positive coefficient, which means that studies that measured the effect of time-limited employment on fertility controlling for individuals' income, found on average a weaker effect with respect to studies that did not control for income.

Table 7 – Meta-regressions (dependent variable: effect-estimates about time-limited employment vs. unlimited-time employment). All models are controlled for gender and welfare state, n=44.

	Model 1	***p***	**Model 2**	***P***
Second or higher order birth *(ref. first birth)*	-0.016	0.971	-0.017	0.978
Period	-0.003	0.839	-0.003	0.831
Couple level *(ref. individual level)*	0.087	0.951		
Control for income *(ref. no control for income)*			0.103	0.967

Note: results are controlled for gender welfare state grouping. "p" is the proportion of simulated coefficients that are smaller (or larger) than 0, if the average coefficient is smaller (or larger than 1).

Source: our elaboration on meta-sample

4.4 Findings from the network meta-analysis

Focusing on the subset of papers addressing the comparisons between time-limited *versus* unlimited-time employment and unemployment *versus* unlimited-time employment, we defined a network involving three conditions: unlimited-time employment, time-limited employment, and unemployment. The NMA allowed us to estimate, at the same time, the ORs of time-limited employment and unemployment in respect to unlimited-time employment (taken as the reference), and so we were able to rank the three employment conditions according to their effect on fertility. Note that with the NMA we obtained a posterior distribution of the rank of each employment condition. Thus, we computed the median rank from each distribution, and rounded it to the closest integer for ease of reading. This produced the rank reported in Tables 8 and 9. First, we conducted a

NMA on the whole subset of studies, and then we did so separately for men and women. Finally, we ran a gender-specific NMA for childless individuals and parents. Note that we could not run meta-analyses specific to welfare states (as in Table 3) due to the small sample size.

Our findings turned out – again – to be clearly gender-specific. We found that, among women, limited-time employment had a worse effect on fertility than being unemployed (with respect to unlimited-time employment). There was an OR of time-limited versus unlimited-time employment equal to 0.88, and an OR of unemployment versus unlimited-time employment equal to 0.97. For men the opposite was true. We found unemployment to be more detrimental for fertility than fixed-time employment (OR=0.87 vs OR=93) (Table 8). This is a novel result: the gender-specific ranking of unemployment and term-limited employment was possible because this study employed an NMA.

As regards the differences between childless individuals and individuals who already have at least one child, Table 9 shows that the relationship between employment uncertainty and the transition to parenthood is not different from that of the pooled sample. The same result is found for the transition to higher parities among women: having time-limited employment is the most detrimental employment condition for women who want to enlarge their family, with an OR of time-limited employed *versus* unlimited-time employment equal to 0.87. Unfortunately, the number of studies focusing on the transition to higher parities among men is not large enough to allow a specific NMA. For the sake of simplicity, results about heterogeneity and inconsistency are not reported in the tables. However, the heterogeneity index is always higher than the inconsistency index, suggesting that the largest share of the total variability originates from the between studies variance, rather than from differences due to the study designs.

Table 8 – Network meta-analysis, results by gender. Odds ratios are reported.

women					**men**				
rounded rank	**Effect**	**OR**	**p**	**n**	**rounded rank**	**effect**	**OR**	**p**	**n**
#1	time-limited	0.88	0.99	52	#1	unemployment	0.87	0.97	22
#2	unemployment	0.97	0.74		#2	time-limited	0.93	0.92	

Note: "p" is the proportion of simulated OR that are smaller (or larger) than 1, if the average OR is smaller (or larger than 1).

Source: our elaboration on meta-sample

Table 9 – Network meta-analysis, results by parity and gender. Odds ratios are reported.

	transition to the 1st child					transition to second or higher parity				
	rounded rank	**Effect**	**OR**	**p**	**n**	**rounded rank**	**effect**	**OR**	**p**	**N**
Women	#1	time-limited	0.89	0.97	40	#1	time-limited	0.90	0.87	12
	#2	unemployment	0.98	0.66		#2	unemployment	1.01	0.52	
Men	#1	unemployment	0.88	0.97	12	-				
	#2	time-limited	0.93	0.93						

Note: "p" is the proportion of simulated OR that are smaller (or larger) than 1, if the average OR is smaller (or larger than 1).

Source: our elaboration on meta-sample

5. Discussion

The relationship between employment uncertainty and fertility has proved of increasing interest to researchers. The evidence produced by these studies has been equivocal and inconsistent, however. Because micro-level studies have often focused on one country or a particular issue, they have been unable to offer generalizable findings. The meta-analysis reported in this paper was undertaken to remedy that problem: it was based on findings on the impact of employment uncertainty on fertility in European countries from the early 1970s to 2015.

Several conclusions can be drawn from the study. First, our findings revealed a clear gender-specific effect for both time-limited employment and unemployment on childbearing. From the pairwise meta-analyses, we found that having a time-limited job is strongly detrimental for women's fertility, while the effect on men is smaller and weaker. Conversely, being unemployed significantly reduces fertility among men, but it can increase fertility for women (in all areas but Southern Europe). Results from the NMA confirm and generalize this ranking: taking unlimited-time employment as a reference category, unemployment has the worst effect on men's fertility, and time-limited employment has the worst effect on women's fertility. We explain this result recalling the male breadwinner model: in a couple, the man is often the main earner, and being employed represents a prerequisite for childbearing and childrearing. Hence, having a time-limited job is always better than being unemployed for men. Temporary employment, which is especially diffuse among women, makes family-work reconciliation harder. Furthermore, the opportunity cost of childbearing is usually particularly high for women in non-permanent employment. This outcome is, in the end, very much in line with the traditional micro-economic interpretation that emphasizes the husband's breadwinner capacity. Men suffer from unemployment more than women. Having a place in the labor market which restores men's social status and their role as income provider is a prerequisite for having children. But increasingly both partners search for employment before having children. The

precariousness of contemporary labor markets – often gendered, with women more exposed to employment uncertainties than men – is central in European fertility dynamics.

Second, the welfare state proved to be a significant moderator of the relationship between employment uncertainty and fertility. Our findings show that the negative impact of time-limited employment on fertility is the strongest in Southern Europe countries, where social protection is lowest. There is, meanwhile, no effect in countries like Germany and Austria. Similarly, unemployment proved to be strongly detrimental for fertility especially in Southern Europe. Recently, Barbieri and Bozzon (2016) showed that the risk of entering poverty at childbirth in Southern Europe is elevated compared to other European Union welfare clusters. This was especially true for single-earner families and dual-earner families with precariously employed or unemployed members. The low protection of the Southern European family and social policies plays a crucial role here. Poor labor market prospects and welfare state performance, characterized by familialism, low levels of state support for childcare, and difficulties in balancing work and family life particularly for women create, a family unfriendly environment (Barbieri and Scherer 2009; Barbieri et al. 2015).

In addition, results from the meta-regressions show that the relationship between employment uncertainty and fertility has not remained steady over time. During the decades covered by our meta-study, the effect of both unemployment and time-limited employment on fertility has become more negative. The oldest collected works include data from the late 1970s and 1980s. The collected works mostly covered, though, the 1990s and, especially, the 2000s, when the diffusion of time-limited jobs started to become an issue. There are also some very recent publications spanning the years of the Great Recession. Reflecting on the deep transformations in labor market dynamics over the last forty years (de-regulation and structural and individual insecurity levels), the nexus between employment uncertainty and childbearing gradually became more and more negative. A similar trend suggests that the persistence – or even the escalation – of employment uncertainty levels hampers fertility with growing intensity, at least in institutional contexts which failed to adapt to the abovementioned changes in economic and social conditions.

On average, the effect of employment uncertainty on fertility also changes depending on parity. Most studies we located addressed the relationship between employment uncertainty (mostly unemployment) and the transition to first birth. The results showed that employment uncertainty might also be important for the transition to higher-order births. Earlier, we formulated two competing hypotheses. The first one presupposed that employment uncertainty matters less for higher-order births, as individuals who made a transition to parenthood late usually face stronger time constraints and need to speed up their transition to the second child if they want to give a companion to their first child. The second hypothesis assumed that employment uncertainty may, in fact, discourage people

from having a second or higher order child, as the decision to have a subsequent child may be less emotionally driven and more strongly determined by financial constraints than the decision to have a first child. While we did not find unemployment to have differential effect on fertility by parity, our findings on the impact of time-limited employment are strongly in line with the second hypothesis. This finding suggests that having a stable source of income is crucial for enlarging the family, more so than for entering parenthood. Our results suggest that future research should concentrate on the impact of economic uncertainty not only on the progression to the first child – a standard practice in this literature – but also to higher order births.

Finally, this article also uncovered two potential mechanisms through which employment uncertainty affects fertility. Studies in which the authors did not control for at least one of the partner's characteristics (e.g., educational level, employment condition, income) report, on average, a stronger effect of employment uncertainty on fertility. The extent to which uncertainty due to precarious employment conditions affects individuals' fertility outcomes also depends on their partner's employment status. Since the decision to have a child is usually made within couples, partner's characteristics might compensate for his or her job uncertainty. In a similar vein, when studies did not control for the respondent's or household income, a stronger negative effect of employment uncertainty on fertility was detected. Such results are particularly supported by data for time-limited employment. Income is a pivotal factor in properly assessing the relationship between employment uncertainty and fertility. After all, having a time-limited job does not necessarily lead to poverty and, consequently, not all temporary jobs are "bad jobs". Some individuals may even decide voluntarily to work on time-limited contracts, in well-paid, high-level occupations. Such freedom of choice does not necessarily hinder fertility. We conclude that income and partner's characteristics are crucial mediators of the effects of employment uncertainty on fertility: failing to control for income and partner's characteristics leads to an overestimation of the negative effect of employment uncertainty on fertility.

Our study did not cover all possible sources of employment uncertainty. For instance, involuntary part-time contracts, on-call jobs and informal jobs are also important channels of employment uncertainty. We were not able to include studies which investigate fertility effects of these work arrangements in our analyses due to their limited number. Nonetheless, this paper contributes to our knowledge about the relationship between employment uncertainty and fertility in Europe. It does so by integrating and systematizing the existing quantitative findings on the influence of unemployment and term-limited working conditions on fertility. Employment uncertainty has become an intrinsic feature of the globalizing world, and its effects on fertility are a major research topic for the years to come. With the meta-analysis presented in this article we helped translate the

fragmented micro-level findings on the topic into general conclusions about the effects of employment uncertainty on fertility, which should also feed further research on the topic.

Appendix

Figure 2 – Funnel plots for meta-analyses about the relationship between unemployment (as opposed to employment) and fertility, gender-specific models.

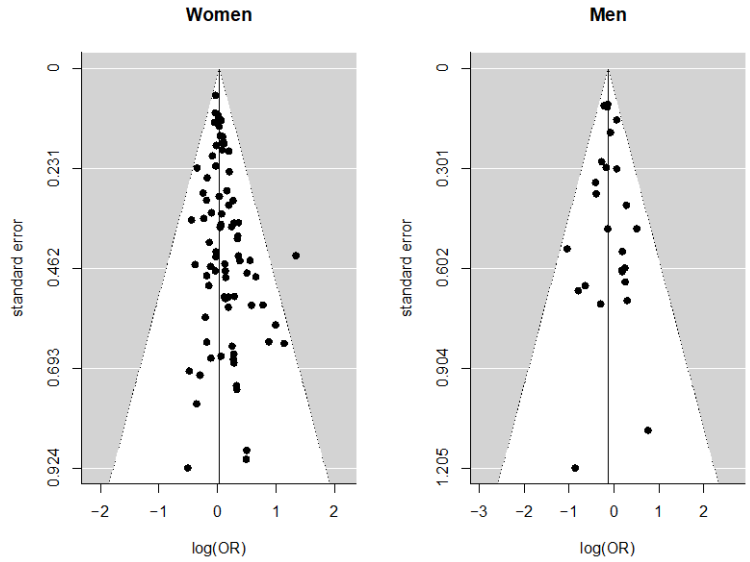


Figure 3 - Posterior distribution of effect-sizes from the meta-analyses about the relationship between unemployment (as opposed to employment) and fertility, gender-specific models.

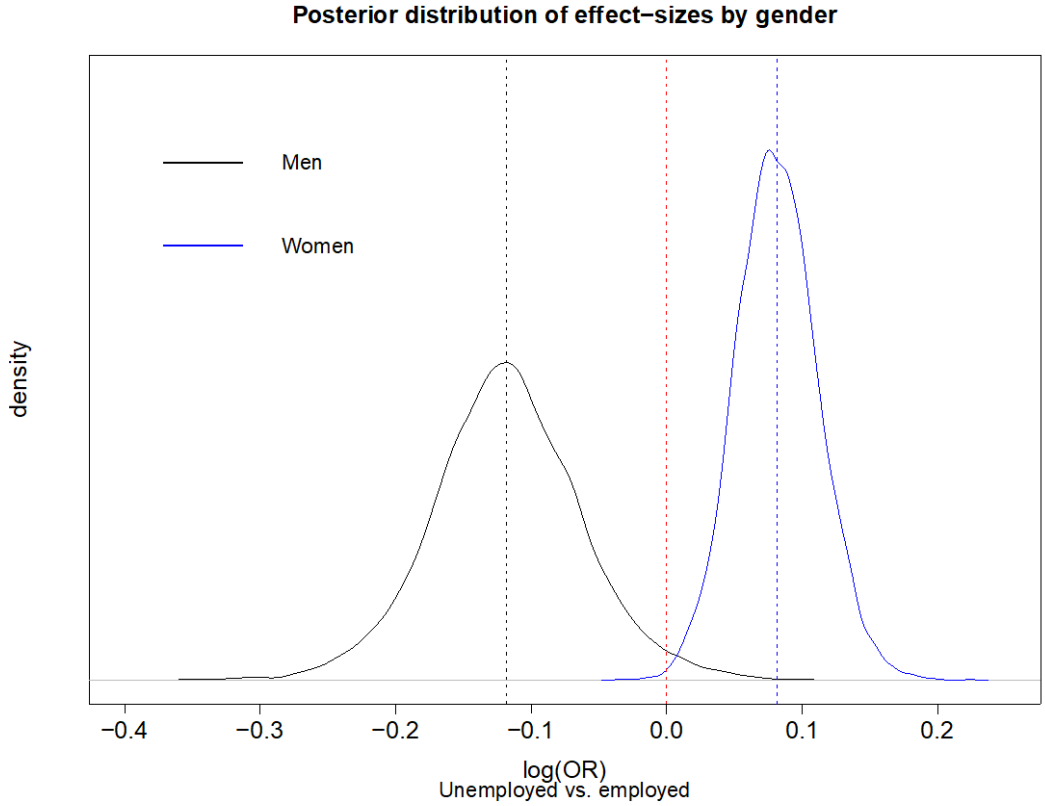


Figure 4 – Funnel plots for meta-analyses about the relationship between unemployment (as opposed to employment) and fertility, welfare and gender-specific models (w = women; m = men). Standard errors for each log(OR) are reported on the y-axis.

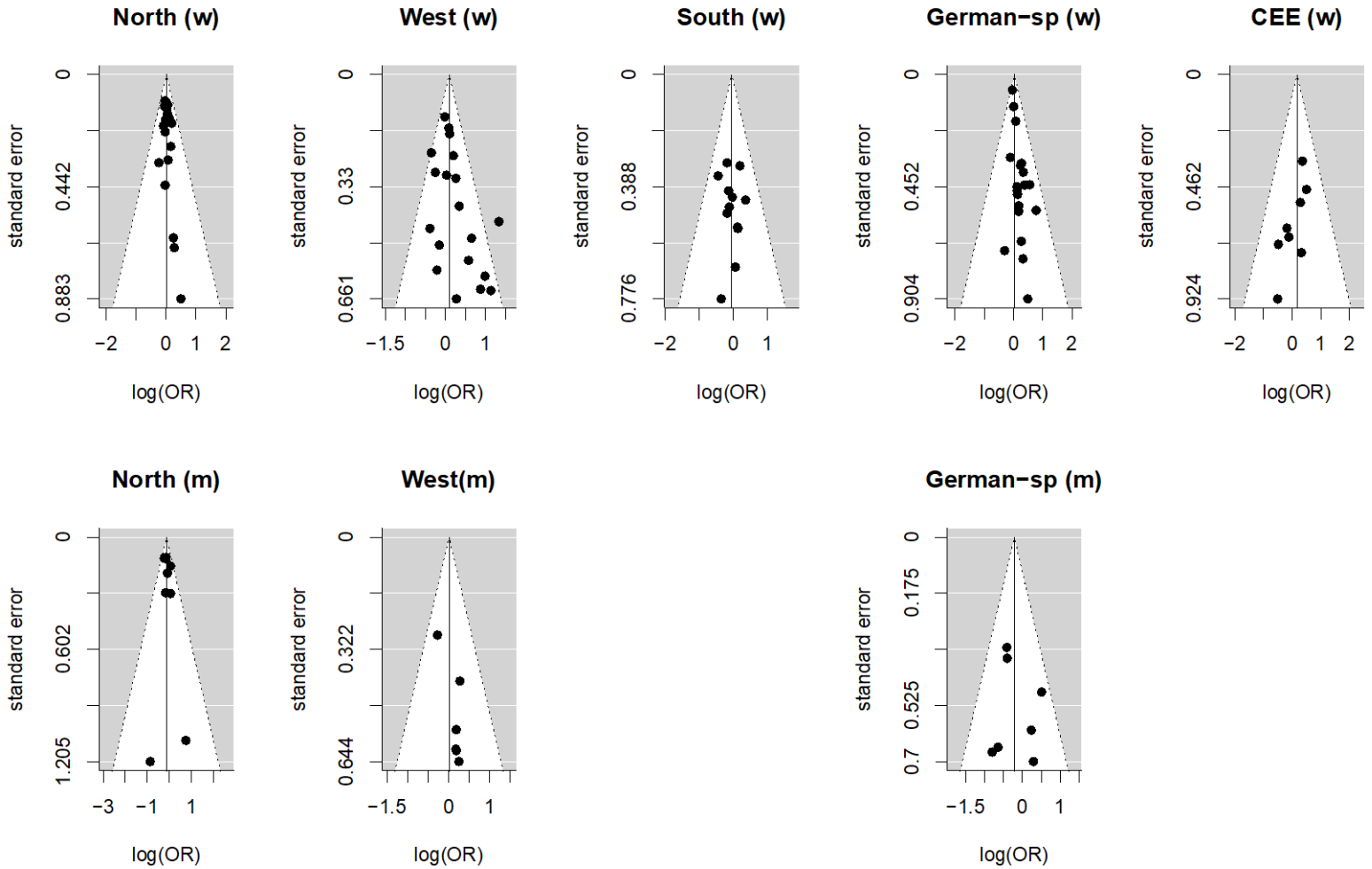
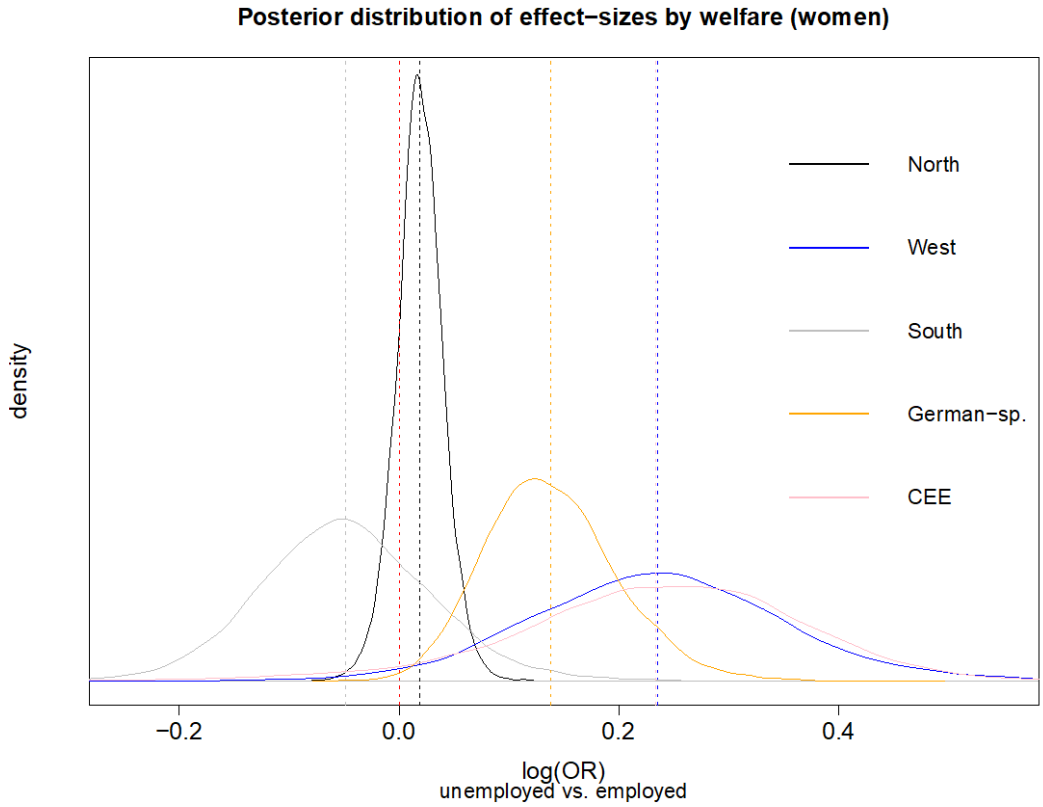


Figure 5 – Posterior distribution of effect-sizes from the meta-analyses about the relationship between unemployment (as opposed to employment) and fertility, welfare and gender-specific models.



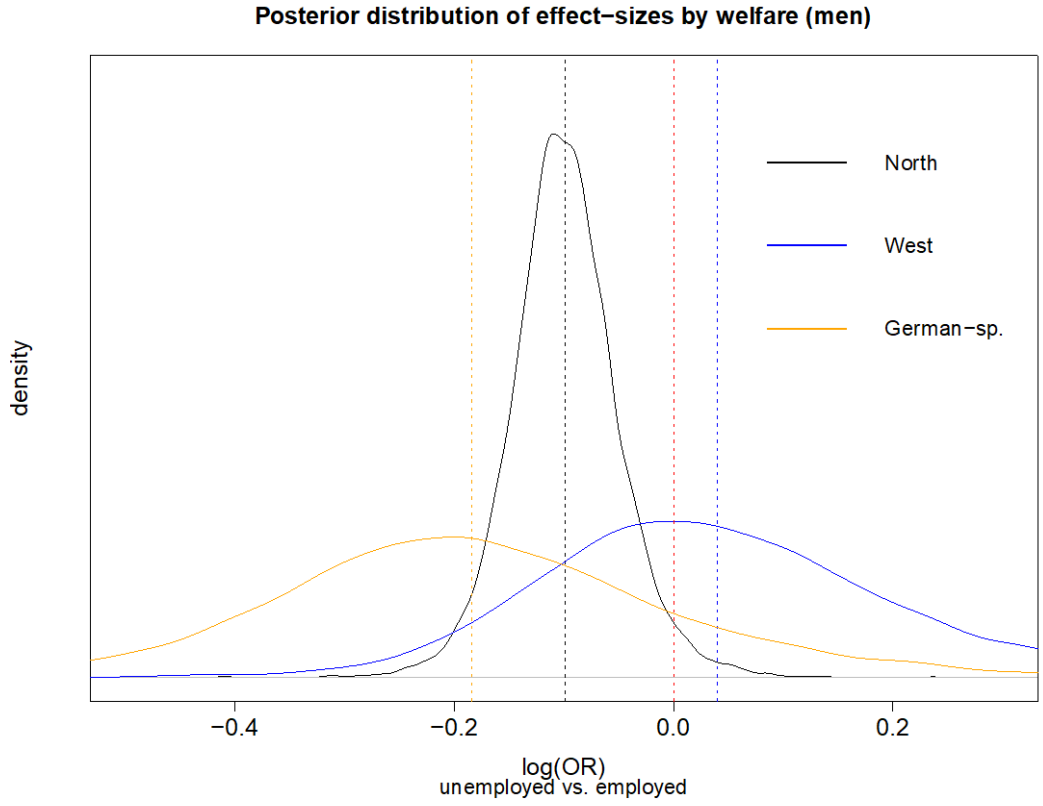


Figure 6 – Funnel plots for meta-analyses about the relationship between time-limited employment (as opposed to unlimited-time employment) and fertility, gender-specific models.

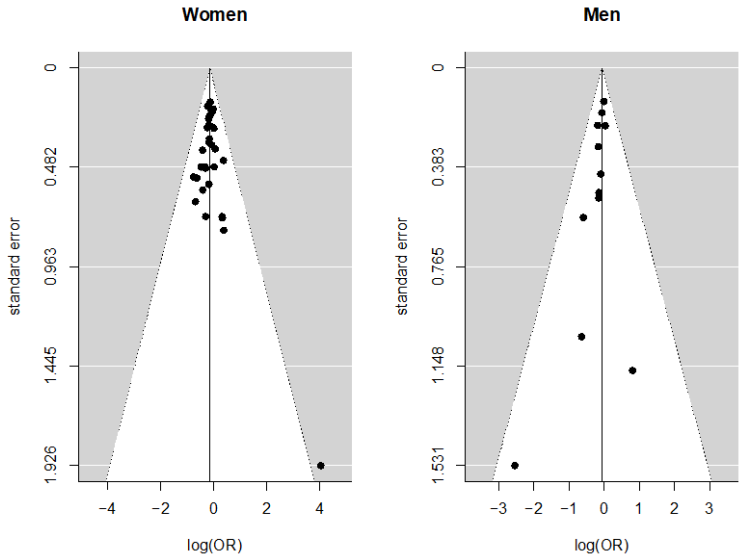


Figure 7 – Posterior distribution of effect-sizes from the meta-analyses about the relationship between time-limited employment (as opposed to unlimited-time employment) and fertility, gender-specific models.

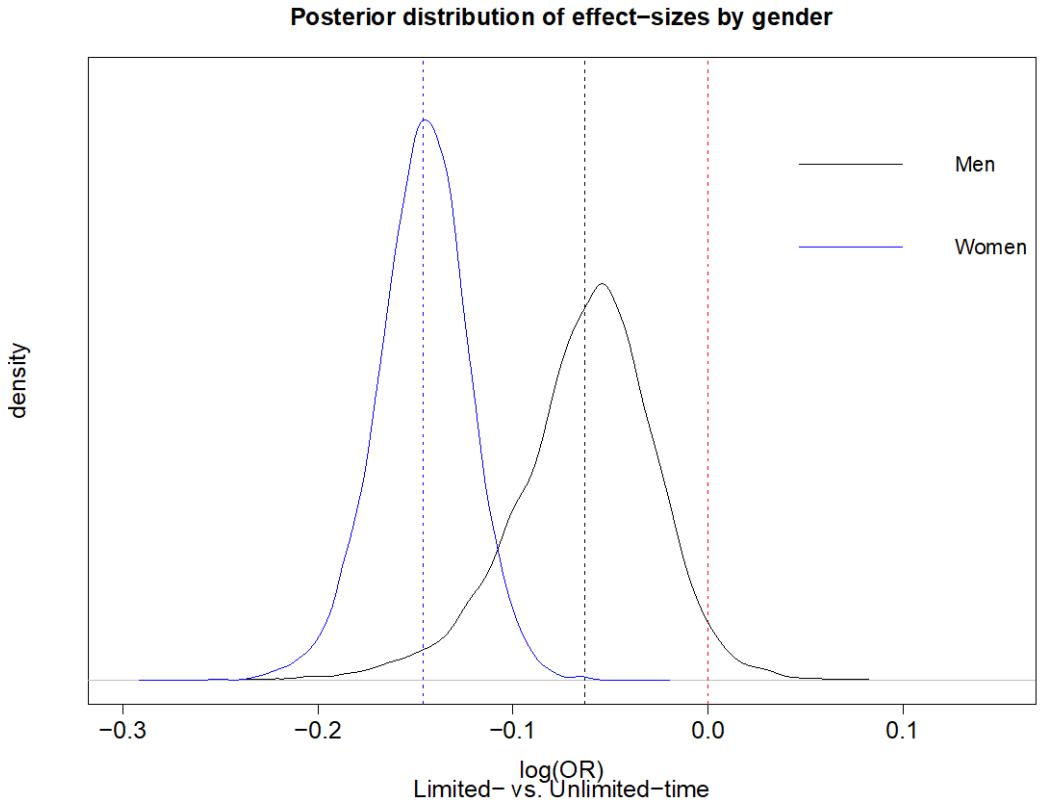


Figure 8 – Funnel plots for meta-analyses about the relationship between time-limited employment (as opposed to unlimited-time employment) and fertility, welfare and gender-specific models (w = women; tot = pooled dataset). Standard errors for each log(OR) are reported on the y-axis.

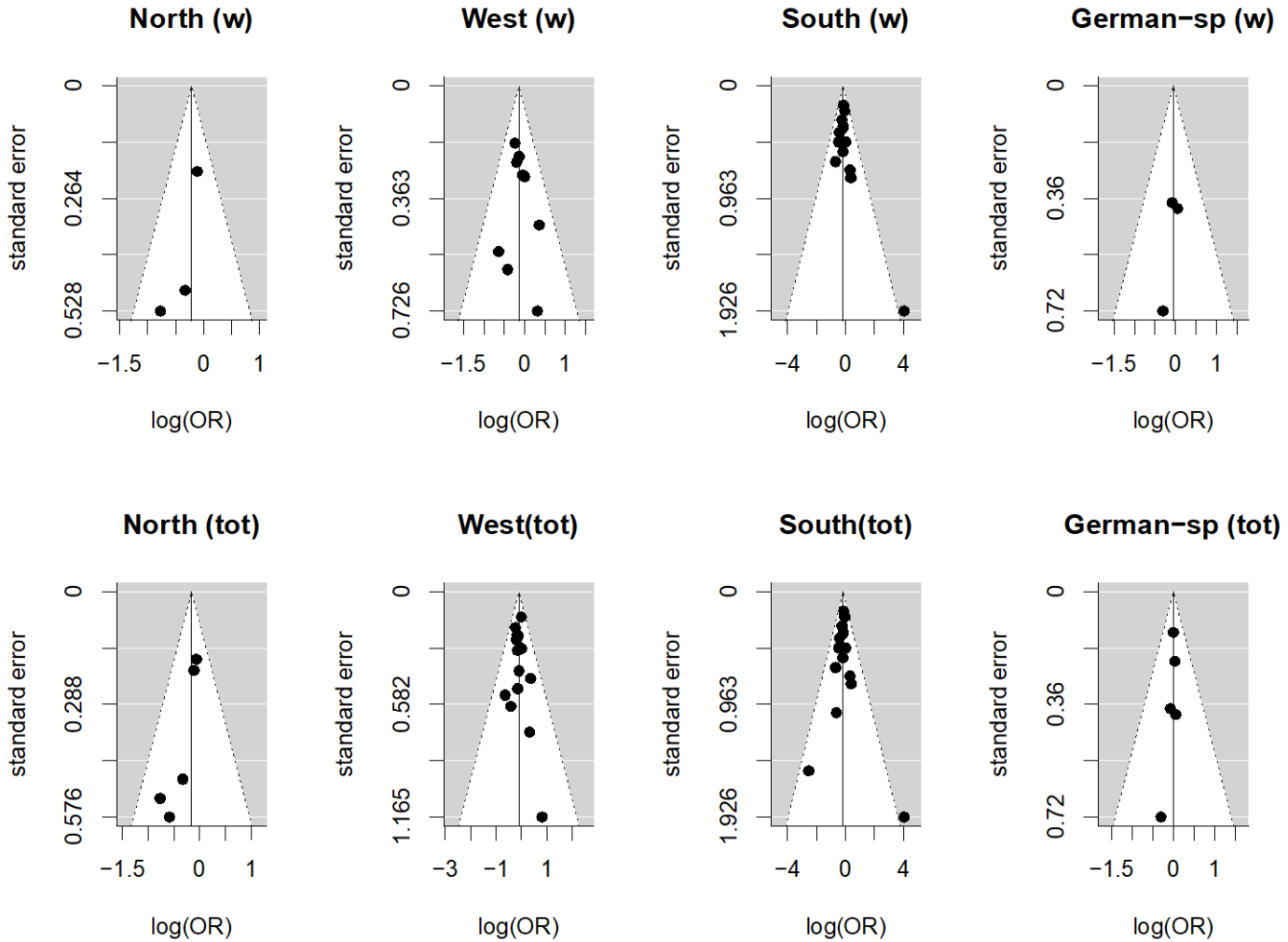
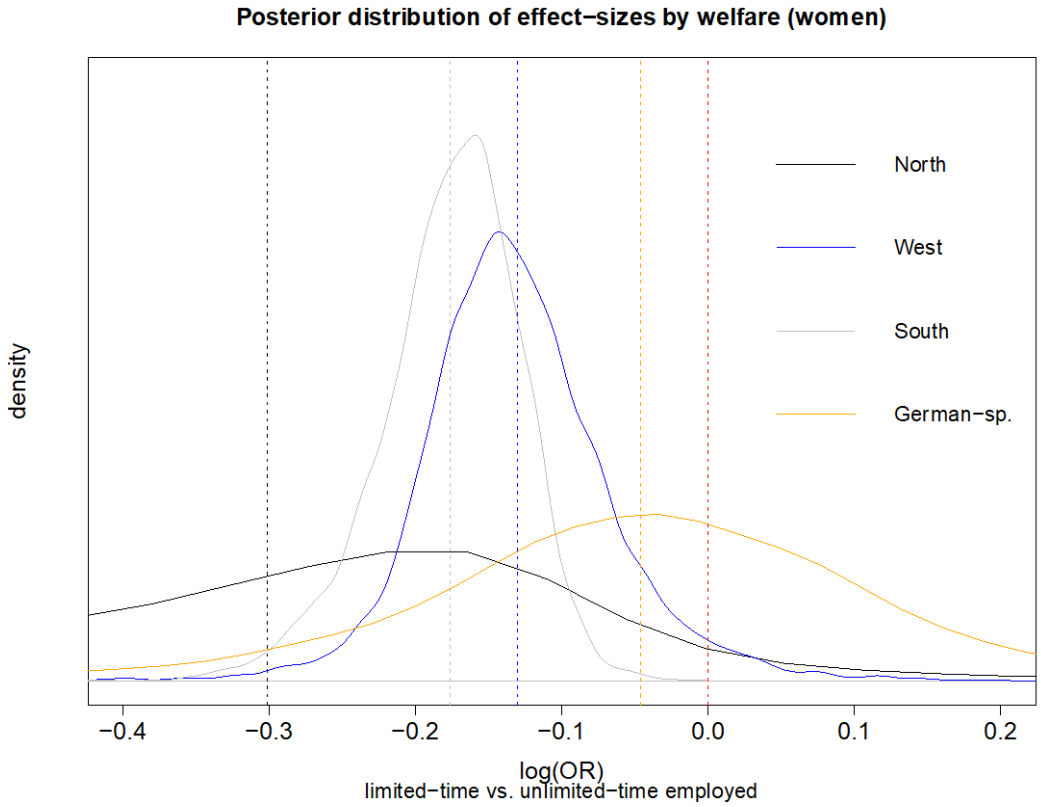


Figure 9 – Posterior distribution of effect-sizes from the meta-analyses about the relationship between time-limited employment (as opposed to unlimited-time employment) and fertility, welfare and gender-specific models.



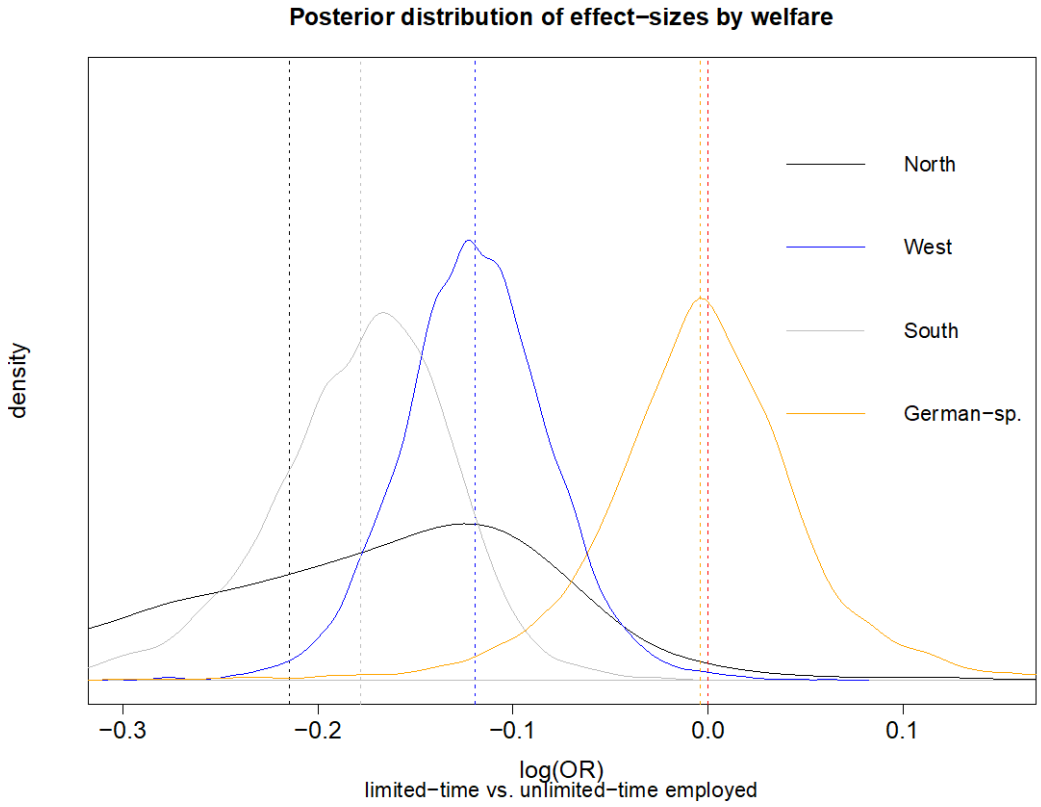


Table 10 – Results of the Egger's test for the asymmetry of funnel plots for each meta-analysis. When the test detects relevant asymmetry in the funnel plot (i.e., when $p < 0.05$), this is indicative of publication bias.

Unemployment vs. employment				**Time-limited vs. unlimited-time employment**			
Gender	Country group	z	p-value	Gender	Country group	z	p-value
Women	all	2.34	0.02	Women	all	0.27	0.79
Men	all	0.33	0.74	Pooled	all	-1.29	0.20
Women	Nordic	0.59	0.55	Women	Nordic	-1.07	0.28
Men	Nordic	0.56	0.57	Pooled	Nordic	-1.45	0.15
Women	Western	2.39	0.02	Women	Western	0.38	0.70
Men	Western	1.10	0.27	Pooled	Western	0.14	0.88
Women	Southern	0.25	0.80	Women	Southern	0.67	0.50
Men	Southern	-	-	Pooled	Southern	-0.13	0.89
Women	German-sp.	1.89	0.51	Women	German-sp.	-0.35	0.72
Men	German-sp.	0.46	0.65	Pooled	German-sp.	-0.26	0.79
Women	CEE	-1.25	0.21				
Men	CEE	-	-				

Source: our elaboration on the meta-sample.

Sources of the studies used in the meta-analyses

Adsera (2006); Adsera (2011a); Adsera (2011b); Andersson (2000); Andersson and Scott (2005); Andersson and Scott (2008); Anderson et al. (2014); Baizan (2005); Baizan (2009); Barbieri et al. (2015); Berinde (1999); Bernardi and Nazio (2006); Billingsley et al. (2014); Bygren et al. (2006); Conti and Sette (2013); d'Albis et al. (2017); de Lange et al. (2014); De la Rica and Iza (2005); Del Bono et al. (2015); Dupray and Pailhé (2018); Francesconi and Golsch (2006); Golsch (2003); Gonzalez and Jurado-Guerrero (2006); Grogan (2006); Inanc (2015); Jalovaara and Miettinen (2013); Kieffer et al. (2006); Kohler and Kohler (2002); Kravdal (2002); Kreyenfeld (2009); Kreyenfeld and Andersson (2014); Kreyenfeld (2016); Kulu and Hannemann (2016); Kurz et al. (2006); Liefbroer (2006); Lundstrom and Andersson (2012); Lyons-Amos and Schoon (2017); Martin Garcia (2010); Meron et al. (2002); Olah (2003); Olah and Fratczak (2004); Ozcan et al. (2010); Pailhé and Solaz (2012); Schmitt (2012a); Schmitt (2012b); Sinyavskaya and Billingsley (2015); Sutela (2012); Testa and Toulemon (2006); Vignoli et al. (2012); Vikat (2004); Wolbers (2007); Wood et al. (2017).

Table 11 - Articles and effect-estimates included in the meta-analysis about time-limited (LT) employment vs. unlimited-time (UT) employment (MA1), in the meta-analysis about employment (EM) vs. unemployment (UN) (MA2) and in the Network meta-analysis (NMA). For each article, ORs/RRs with standard errors are reported, plus the main characteristic of the model (gender, parity, countries involved).

Article code	Comparison	MA1	MA2	NMA	Gender	Parity	Country	OR/RR	SE
Adsera_06	LT vs. UT	x		x	F	any	Spain	0.940	0.042
Adsera_11a	LT vs. UT	x		x	F	second child	multiple	0.824	0.063
Adsera_11a	LT vs. UT	x		x	F	second child	multiple	0.829	0.108
Adsera_11a	UN vs. EM		x		F	second child	multiple	1.046	0.135
Adsera_11a	UN vs. EM		x		F	second child	multiple	1.133	0.283
Adsera_11b	LT vs. UT	x		x	F	second child	multiple	0.832	0.058
Adsera_11b	UN vs. EM		x		F	second child	multiple	1.059	0.130
Adsera_11b	UN vs. EM		x		F	third child	multiple	0.962	0.220
Andersson_00	UN vs. EM		x		F	first child	Sweden	1.208	0.037
Andersson_00	UN vs. EM		x		F	second child	Sweden	0.950	0.016
Andersson_00	UN vs. EM		x		F	third child	Sweden	1.100	0.029
Andersson_05	UN vs. EM		x		M	first child	Sweden	0.859	0.013
Andersson_08	UN vs. EM		x		F	second child	Sweden	0.790	0.120
Andersson_08	UN vs. EM		x		M	second child	Sweden	0.840	0.089
Andersson_08	UN vs. EM		x		F	third child	Sweden	0.980	0.032
Andersson_08	UN vs. EM		x		M	third child	Sweden	1.060	0.092
Andersson_14	UN vs. EM		x		F	first child	Germany	1.080	0.035
Andersson_14	UN vs. EM		x		F	second child	Germany	1.130	0.204
Andersson_14	UN vs. EM		x		F	third child	Germany	1.630	0.817
Andersson_14	UN vs. EM		x		F	first child	Denmark	1.320	0.464
Andersson_14	UN vs. EM		x		F	second child	Denmark	0.970	0.051
Andersson_14	UN vs. EM		x		F	third child	Denmark	1.070	0.113
Baizan_05	LT vs. UT	x		x	F	second+ child	Denmark	0.719	0.230
Baizan_05	LT vs. UT	x		x	F	second+ child	Italy	1.010	0.230
Baizan_05	LT vs. UT	x		x	F	second+ child	Spain	0.619	0.230
Baizan_05	LT vs. UT	x		x	F	second+ child	UK	0.657	0.350
Baizan_05	UN vs. EM		x		F	second+ child	Denmark	0.970	0.190
Baizan_05	UN vs. EM		x		F	second+ child	Italy	0.887	0.210
Baizan_05	UN vs. EM		x		F	second+ child	Spain	0.970	0.180
Baizan_05	UN vs. EM		x		F	second+ child	UK	1.786	0.300
Baizan_09	LT vs. UT	x		x	F	first child	Spain	0.654	0.159
Baizan_09	LT vs. UT	x		x	F	second+ child	Spain	0.732	0.236
Baizan_09	UN vs. EM		x		F	first child	Spain	0.640	0.123
Baizan_09	UN vs. EM		x		F	second+ child	Spain	0.868	0.162
Barbieri_15	LT vs. UT	x		x	F	first child	Italy	1.363	0.519
Barbieri_15	LT vs. UT	x		x	F	first child	Spain	0.827	0.318
Berinde_99	UN vs. EM		X		F	third child	Sweden	1.170	0.080

Bernardi_05	LT vs. UT	x		x	M	first child	Italy	0.527	1.071
Bernardi_05	LT vs. UT	x		x	F	first child	Italy	1.448	0.619
Bernardi_05	UN vs. EM		x		M	first child	Italy	0.869	0.234
Bernardi_05	UN vs. EM		x		F	first child	Italy	0.698	0.602
Billingsley_14	UN vs. EM		x		-	first child	Estonia	0.780	0.269
Bygren_05	UN vs. EM		x		M	first child	Sweden	2.132	2.538
Bygren_05	UN vs. EM		x		F	first child	Sweden	1.642	1.281
Conti_13	LT vs. UT	x		x	F	any	Italy	0.874	0.027
Dalbis_17	UN vs. EM		x		F	second child	multiple	0.835	0.064
Delange_14	LT vs. UT	x		x	M	first child	Netherlands	2.250	3.052
Delange_14	LT vs. UT	x		x	F	first child	Netherlands	1.370	0.721
Delange_14	UN vs. UT		x	x	-	first child	Netherlands	0.800	0.373
Delange_14	UN vs. UT		x	x	F	first child	Netherlands	0.860	0.252
Delarica_05	LT vs. UT	x		x	F	first child	Spain	0.657	0.231
Delbono_15	UN vs. EM		x		F	any	Austria	0.968	0.004
Dupray_18	LT vs. UT	x		x	F	first child	France	0.787	0.034
Dupray_18	LT vs. UT	x		x	M	first child	France	0.833	0.049
Dupray_18	UN vs. UT		x	x	F	first child	France	0.705	0.053
Dupray_18	UN vs. UT		x	x	M	first child	France	0.759	0.079
Francesconi_05	LT vs. UT	x		x	M	first child	UK	0.905	0.167
Francesconi_05	LT vs. UT	x		x	F	first child	UK	0.952	0.082
Francesconi_05	UN vs. EM		x		M	first child	UK	1.281	0.414
Francesconi_05	UN vs. EM		x		F	first child	UK	3.116	1.261
Golsch_03	LT vs. UT	x		x	M	first child	Spain	0.079	2.343
Golsch_03	LT vs. UT	x		x	F	first child	Spain	55.813	207.1
Golsch_03	UN vs. UT		x	x	M	first child	Spain	0.352	0.296
Golsch_03	UN vs. UT		x	x	F	first child	Spain	0.830	0.230
Gonzalez_06	LT vs. UT	x		x	F	first child	Spain	0.779	0.084
Gonzalez_06	LT vs. UT	x		x	F	first child	France	1.000	0.086
Gonzalez_06	LT vs. UT	x		x	F	first child	Italy	0.844	0.118
Gonzalez_06	LT vs. UT	x		x	F	first child	Germany	1.051	0.154
Gonzalez_06	UN vs. UT		x	x	F	first child	Spain	0.827	0.093
Gonzalez_06	UN vs. UT		x	x	F	first child	France	0.779	0.083
Gonzalez_06	UN vs. UT		x	x	F	first child	Italy	1.209	0.100
Gonzalez_06	UN vs. UT		x	x	F	first child	Germany	1.462	0.198
Grogan_06	UN vs. EM		x		F	any	Russia	0.891	0.449
Inanc_15	UN vs. EM		x		M	first child	UK	1.315	0.204
Inanc_15	UN vs. EM		x		F	first child	UK	3.813	0.716
Jalovaara_13	UN vs. EM		x		M	first child	Finland	1.060	0.024
Jalovaara_13	UN vs. EM		x		F	first child	Finland	1.050	0.024
Kieffer_05	UN vs. EM		x		F	first child	France	1.029	0.088
Kohler_02	UN vs. EM		x		F	any	Russia	0.829	0.401
Kohler_02	UN vs. EM		x		F	any	Russia	0.616	0.490
Kravdal_02	UN vs. EM		x		F	first child	Norway	1.060	0.014

Kravdal_02	UN vs. EM		x		F	second+ child	Norway	0.960	0.011
Kravdal_02	UN vs. EM		x		M	first child	Norway	0.800	0.013
Kravdal_02	UN vs. EM		x		M	second+ child	Norway	0.870	0.012
Kreyenfeld_09	UN vs. EM		x		F	first child	Germany	1.200	0.305
Kreyenfeld_09	UN vs. EM		x		F	first child	W Germany	0.740	0.504
Kreyenfeld_09	UN vs. EM		x		F	first child	W Germany	1.150	0.234
Kreyenfeld_09	UN vs. EM		x		F	first child	E Germany	1.310	0.452
Kreyenfeld_14	UN vs. EM		x		M	first child	Germany	0.662	0.118
Kreyenfeld_14	UN vs. EM		x		M	second child	Germany	0.670	0.143
Kreyenfeld_14	UN vs. EM		x		M	third child	Germany	1.660	0.234
Kreyenfeld_14	UN vs. EM		x		F	first child	Germany	0.900	0.112
Kreyenfeld_14	UN vs. EM		x		F	second child	Germany	1.140	0.219
Kreyenfeld_14	UN vs. EM		x		F	third child	Germany	1.400	0.155
Kreyenfeld_16	UN vs. EM		x		F	first child	Germany	1.010	0.017
Kreyenfeld_16	UN vs. EM		x		F	second child	Germany	1.270	0.134
Kreyenfeld_16	UN vs. EM		x		F	third child	Germany	1.740	0.197
Kulu_16	UN vs. EM		x		F	first child	UK	1.300	0.093
Kulu_16	UN vs. EM		x		F	second child	UK	0.810	0.332
Kulu_16	UN vs. EM		x		F	third child	UK	1.920	0.232
Kulu_16	UN vs. EM		x		F	fourth child	UK	1.320	0.437
Kurz_05	LT vs. UT	x		x	F	first child	Germany	0.733	0.519
Kurz_05	LT vs. UT	x		x	M	first child	Germany	0.990	0.017
Kurz_05	UN vs. EM		x		F	first child	Germany	1.391	0.552
Kurz_05	UN vs. EM		x		M	first child	Germany	0.449	0.449
Liefbroer_05	LT vs. UT	x		x	F	first child	Netherlands	0.527	0.286
Liefbroer_05	LT vs. UT	x		x	M	first child	Netherlands	0.861	0.251
Lundstrom_12	LT vs. UT	x		x	F	first child	Sweden	0.771	0.040
Lundstrom_12	LT vs. UT	x		x	M	first child	Sweden	0.862	0.030
Lundstrom_12	UN vs. UT		x	x	F	first child	Sweden	0.815	0.041
Lundstrom_12	UN vs. UT		x	x	M	first child	Sweden	0.830	0.037
Lyons_17	UN vs. EM		x		F	first child	UK	1.410	0.150
Martingarcia_10	UN vs. EM		x		F	first child	Spain	1.426	0.188
Martingarcia_10	UN vs. EM		x		F	second child	Spain	1.141	0.283
Martingarcia_10	UN vs. EM		x		F	third child	Spain	1.125	0.279
Meron_02	LT vs. UT	x		x	F	first child	France	0.874	0.052
Meron_02	UN vs. UT		x	x	F	first child	France	0.985	0.015
Olah_03	UN vs. EM		x		F	second child	Sweden	1.280	0.413
Olah_03	UN vs. EM		x		M	second child	Sweden	0.420	1.451
Olah_03	UN vs. EM		x		F	second child	Hungary	1.430	0.127
Olah_03	UN vs. EM		x		M	second child	Hungary	0.740	0.504
Olah_04	UN vs. EM		x		F	first child	Hungary	0.600	0.855
Olah_04	UN vs. EM		x		F	first child	Poland	1.380	0.539
Ozcan_10	UN vs. EM		x		F	first child	Germany	1.202	0.279
Ozcan_10	UN vs. EM		x		M	first child	Germany	0.526	0.429

Pailhé_12	LT vs. UT	x		x	M	first child	France	0.849	0.092
Pailhé_12	LT vs. UT	x		x	F	first child	France	0.819	0.061
Schmitt_12a	LT vs. UT	x		x	M	first child	Germany	1.030	0.049
Schmitt_12a	LT vs. UT	x		x	F	first child	Germany	0.920	0.139
Schmitt_12a	LT vs. UT	x		x	M	first child	UK	0.990	0.017
Schmitt_12a	LT vs. UT	x		x	F	first child	UK	1.430	0.201
Schmitt_12a	UN vs. UT		x	x	M	first child	Germany	1.340	0.490
Schmitt_12a	UN vs. UT		x	x	F	first child	Germany	1.320	0.128
Schmitt_12a	UN vs. UT		x	x	M	first child	UK	1.200	0.305
Schmitt_12a	UN vs. UT		x	x	F	first child	UK	2.690	0.353
Schmitt_12b	UN vs. EM		x		M	first child	France	1.200	0.375
Schmitt_12b	UN vs. EM		x		M	first child	Germany	1.270	0.362
Schmitt_12b	UN vs. EM		x		M	first child	UK	1.190	0.370
Schmitt_12b	UN vs. EM		x		F	first child	France	0.680	0.206
Schmitt_12b	UN vs. EM		x		F	first child	Germany	2.170	0.300
Schmitt_12b	UN vs. EM		x		F	first child	UK	2.400	0.400
Sinyavskaya_15	UN vs. EM		x		F	first child	Russia	1.330	0.278
Sinyavskaya_15	UN vs. EM		x		F	second child	Russia	1.650	0.224
Sutela_12	LT vs. UT	x		x	F	first child	Finland	0.462	0.279
Sutela_12	LT vs. UT	x		x	M	first child	Finland	0.555	0.332
Testa_06	UN vs. EM		x		-	first child	France	0.100	0.820
Vignoli_12	LT vs. UT	x		x	F	first child	Italy	0.500	0.420
Vignoli_12	UN vs. EM		x		F	first child	Italy	1.060	0.443
Vikat_04	UN vs. EM		x		F	first child	Finland	1.009	0.012
Vikat_04	UN vs. EM		x		F	second child	Finland	1.030	0.013
Vikat_04	UN vs. EM		x		F	third child	Finland	1.060	0.018
Wolbers_07	LT vs. UT	x		x	M	first child	multiple	0.864	0.230
Wolbers_07	LT vs. UT	x		x	F	first child	multiple	0.975	0.040
Wood_17	UN vs. EM		x		F	first child	Belgium	1.090	0.025
Wood_17	UN vs. EM		x		F	second child	Belgium	1.112	0.030
Wood17	UN vs. EM		x		F	third child	Belgium	1.220	0.057

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